DAC-AES8

Audio Converter Module

User manual

Rev. 1

Nevion Support

Revision history

Current revision of this document is the uppermost in the table below.

Rev.	Repl.	Date	Sign	Change description
1	-	2012-03-16	MDH	First Release

Contents

1 Product overview

The DAC-AES8 has four stereo D/A converters on a single module. The module may be used as a normal Flashlink module in the original frame, N boxes and Flashcase but may also be used in the new frame in the half width slots as an auxiliary module for the Flashlink XMUX embedder modules.

The gain of the converters may be set on the DIP switches on the module or with the GYDA Multicon system controller. The gain settings on the D/A converters may be set to a level from +24dBu with 1 dB steps.

The converters are calibrated with low impedance sources and high impedance terminations. The outputs are fully compatible with 600 ohm inputs. True 600 ohm outputs are available through special backplanes but the output voltages set with the DIP switches and viewed through GYDA will be 6 dB too low.

The D/A converters will accept sample rates up to 192 kHz.

The analogue audio outputs will be muted if the input signal validity bit shows an invalid sample or if the signal is not normal PCM audio.

1.1 Top view
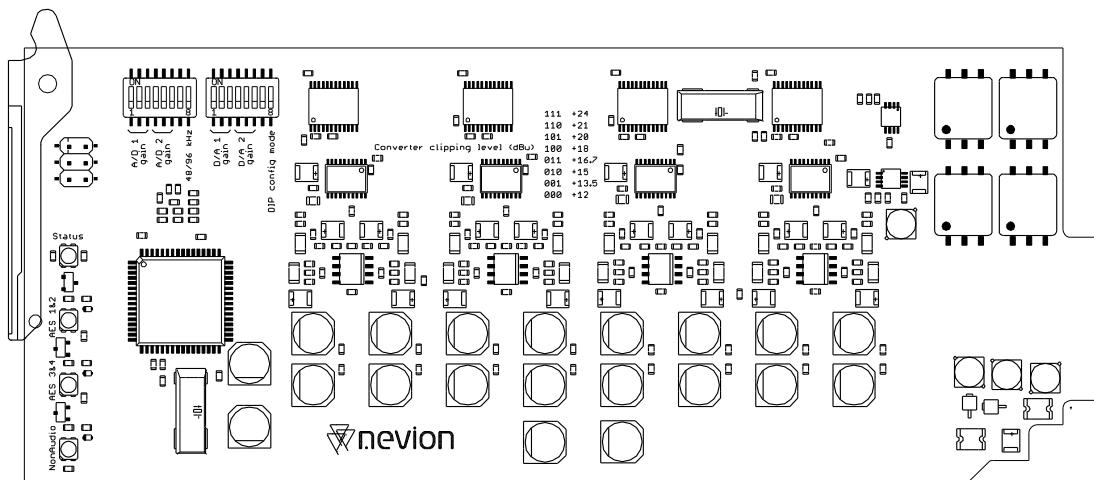
2 Specifications

2.1 D/A converters

Differential output impedance:	53 ohms.
Common mode output impedance:	20 kohm.
Level precision:	$\pm$ 0.1dB where Z_{load} > 10 kohm
Maximum signal level (0 dBFS):	+24dBu or lower in 1 dB steps.
Common mode voltage tolerance:	+50V, -0.1V
Frequency response:	20 Hz – 20 kHz $\pm$ 0.1 dB
Pass-band ripple:	$\pm$ 0.002 dB
Stop band attenuation:	60 dB
Dynamic range[1]:	Min. 103 dB(A) [2]
	Typ. 109 dB(A) 0 dBFS = +18dBu
THD+N @ 1 kHz, -1 dBFS:	Max. -85 dB, typical -85 dB.
Intermodulation distortion[3]:	Max. -75 dB
Crosstalk:	Max. -90 dB, typical -95 dB.
CMRR (1kHz BBC method):	Max. 40 dB, typical 46 dB.
Digital input standard:	AES3 110R differential
Sample frequency:	32 kHz to 192 kHz

2.2 Power

+5V	0.200A	1.0W
+15V	0.050A	0.75W
-15V	0.047A	0.71W

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[1] |THD+N of -60 dBFS 1 kHz signal| + 60.
[2] Dynamic range is a function of full scale level. Minimum result is obtained with 0dBFS = +12dBu
[3] Signal at -12 dBFS, SMPTE 4:1 60 Hz + 7 kHz.

3 Configuration

The module has one main configurable parameter.

1. Converter gain

As all Flashlink modules, the module either uses the internally stored configuration, or uses the configuration on the DIP switches. The DIP switch labeled 'DIP config mode' controls this behavior.

3.1 DIP configuration mode

SW2.8 is the DIP config mode switch.

On: The card will be configured with the other DIP switches. The module will not accept commands from the system controller but may be monitored.

Off: The module will be configured with the internally stored configuration and may be controlled with FLP4 commands as listed in chapter 6.

As with all Flashlink modules, stored configurations in the Multicon controller will be applied to a module that is plugged into a running system, provided that the switch is off and that the last module present in the system was of the same type.

A module with SW2.8 on, plugged into a running system will overwrite the stored configuration in the Multicon controller with its own configuration.

3.1.1 Converter gain
The DIP switches are grouped as sets of three switches for each of the stereo converters. The levels correspond to the maximum sine wave level, otherwise known as 0 dBFS.

Switches	000	001	010	011	100	101	110	111
Max. level (dBu)	+12	+14	+15	+17	18	+20	+21	+24

These values are chosen as being the most used levels in the broadcast industry. Custom values are available, contact Nevion support or your local sales representative.

3.2 Multicon control

The module may be monitored and controlled with the Multicon system controller. The converter gains may be remotely controlled through the module's configuration page of the system controller.

The AES digital audio input signal presence and the onboard power levels are presented on the info page. Alarms are generated for AES input loss and power supply violations.

4 Connections

The standard backplane supplied with the DAC-AES8 is the ADDA-AES8-C1.
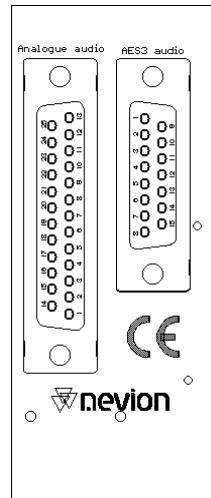
This backplane uses the standard pin assignment for the female DB-25 and a similar one for the female DA-15 as shown below.
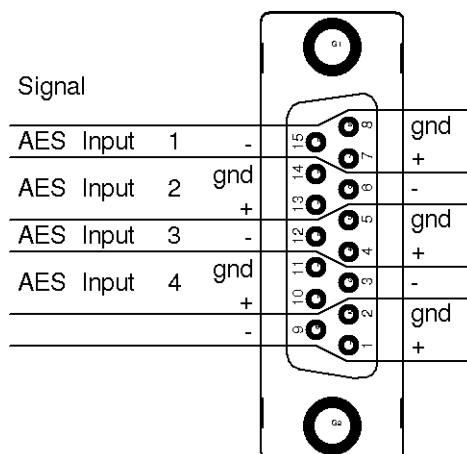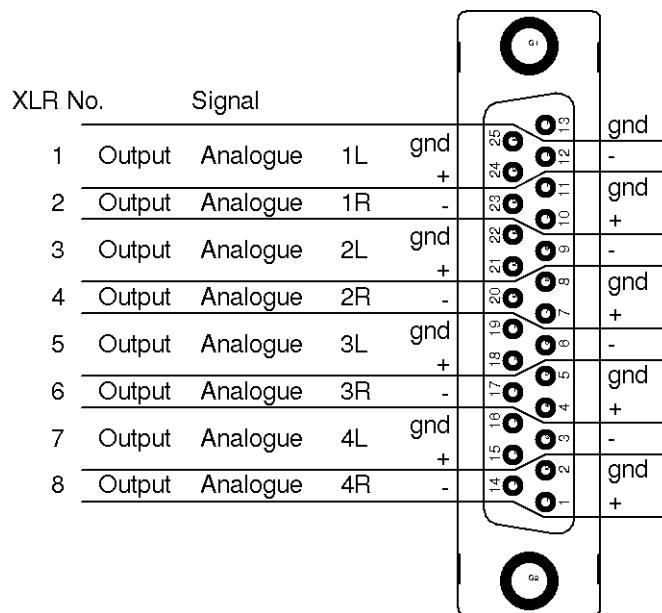
5 Operation

5.1 LEDs
The module has four LEDs.

5.1.1 Status
The Status LED is green when the module is programmed and functioning normally. It will turn red for 1 second when power is applied and then turn green. Orange indicates that the module is not programmed, or is in the process of being programmed. It will turn red if there is something wrong with the power supply levels.

5.1.2 AES input 1 & 2
The LED is green when both AES signals is received correctly.

The LED is red if there are no inputs or both signals have errors.

The LED is orange if one of the signals is present.

5.1.3 AES input 3 & 4
The LED is green when both AES signals is received correctly.

The LED is red if there are no inputs or both signals have errors.

The LED is orange if one of the signals is present.

5.1.4 Non Audio
The LED is green during normal operation.

The LED will turn orange if one of the inputs present is not normal PCM audio and at least one is normal PCM audio.

The LED will turn red if all of the received signals are not normal PCM audio.

6 FLP4 commands

FLP stands for Flashlink Protocol. The current revision of this protocol is 4, hence FLP4. This specification is available from Nevion Support.

The following FLP4 block commands are used in the monitoring and control of the module.

- ablk
- pwr

6.1 ablk

The 'ablk' blocks correspond to the physical audio ports as follows.

Block no.	Audio Port
0	D/A stereo output 1
1	D/A stereo output 2
2	D/A stereo output 3
3	D/A stereo output 4
4	AES input to D/A 1
5	AES input to D/A 2
6	AES input to D/A 3
7	AES input to D/A 4

Blocks 0 to 3 report and accept the 'lvl' keyword followed by the maximum input level in cBu (dBu multiplied by 10).

i.e. ablk 0 lvl 240 cBu

Blocks 4 to 7 report input presence with the 'freq' keyword followed by the received sample frequency or 'los' or 'lol'. Absence of signal is reported with 'los' while 'lol' indicates an unrecognized sample frequency.

i.e. ablk 4 input freq 44 kHz

6.2 pwr

The 'pwr' blocks from 0 to 4 list the levels of the power supplies as measured by the microcontroller.

- 0 is the frame +5V
- 1 is analogue +4.8V
- 2 is the frame +15V
- 3 is the frame -15V
- 4 is digital +3.3V

The frame supplies are measured after the module fuses and filtering.

6.3 On-site re-programming

The module may be re-programmed on site with a GYDA Multicon system controller. Firmware will be provided by Nevion support when necessary.

General environmental requirements for Nevion equipment

1. The equipment will meet the guaranteed performance specification under the following environmental conditions:
    -   Operating room temperature range: 0°C to 45°C
    -   Operating relative humidity range: <90% (non-condensing)

2. The equipment will operate without damage under the following environmental conditions:
    -   Temperature range: -10°C to 55°C
    -   Relative humidity range: <90% (non-condensing)

Product Warranty

The warranty terms and conditions for the product(s) covered by this manual follow the General Sales Conditions by Nevion, which are available on the company web site:

www.nevion.com

Appendix A Materials declaration and recycling information

A.1 Materials declaration

For product sold into China after 1st March 2007, we comply with the "Administrative Measure on the Control of Pollution by Electronic Information Products". In the first stage of this legislation, content of six hazardous materials has to be declared. The table below shows the required information.

組成名稱 Part Name	Toxic or hazardous substances and elements					
	鉛 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
DAC-AES8	O	O	O	O	O	O
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.						
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.						

This is indicated by the product marking:

A.2 Recycling information

Nevion provides assistance to customers and recyclers through our web site http://www.nevion.com/. Please contact Nevion's Customer Support for assistance with recycling if this site does not show the information you require.

Where it is not possible to return the product to Nevion or its agents for recycling, the following general information may be of assistance:

− Before attempting disassembly, ensure the product is completely disconnected from power and signal connections.
− All major parts are marked or labeled to show their material content.
− Depending on the date of manufacture, this product may contain lead in solder.
− Some circuit boards may contain battery-backed memory devices.

EC Declaration of Conformity

MANUFACTURER	Nevion
AUTHORIZED REPRESENTATIVE (Established within the EEA)	Not applicable
MODEL NUMBER(S)	DAC-AES8
DESCRIPTION	Audio Converter Module
DIRECTIVES this equipment complies with	Low voltage (EU Directive 2006/95/EC) EMC (EU Directive 2004/108/EC) RoHS (EU Directive 2002/95/EC) China RoHS[1] WEEE (EU Directive 2002/96/EC) REACH
HARMONISED STANDARDS applied in order to verify compliance with Directive(s)	EN 55103-1:1996 EN 55103-2:1996 EN 60950-1:2006

TEST REPORTS ISSUED BY	**Notified/Competent Body**	**Report no:**

TECHNICAL CONSTRUCTION FILE NO	Not applicable
YEAR WHICH THE CE-MARK WAS AFFIXED	2012
TEST AUTHORIZED SIGNATORY	

MANUFACTURER	**AUTHORIZED REPRESENTATIVE (Established within EEA)**	**Date of Issue**
		2012-05-16
		Place of Issue
	Not applicable	Sandefjord, Norway

NEVION EUROPE AS
O.nr. 976 584 201 MVA

Name	Thomas Øhrbom
Position	VP Business Support Systems, Nevion (authorized signature)

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[1] Administration on the Control of Pollution Caused by Electronic Information Products